

US EPA ARCHIVE DOCUMENT

GRO Summer Internship Final Report
The Long Term Response of Adirondack Surface Waters
to Reductions in Acidic Deposition
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A year and a half ago, I sent away an application for the internship of my dreams. As an environmental engineering student at Syracuse University, I could think of no higher goal than working for the U.S. Environmental Protection Agency. After waiting five long months to hear back, I had nearly given up hope for good news. I remember wishing that someday I would have a chance to work for the Agency, even if I was not chosen for this particular internship. With a heavy heart, I applied elsewhere and hoped another opportunity to apply to the EPA would present itself soon. Just as my last twinkles of hope had dwindled away, I was shocked to find an email in my inbox notifying me of my selection as an GRO Undergraduate Research Fellow for the U.S. Environmental Protection Agency. I can remember reading the email in disbelief, trying to visualize what this internship would mean to my career and my future. Once I had comprehended my acceptance, I was immeasurably excited and unbelievably proud, but I truly had no idea just how amazing this opportunity would be. As I near the completion of my internship here at the EPA, I can honestly say that my initial reaction, while lively, completely underestimated the magnitude of the impact this fellowship would have on my life.

After learning of my acceptance to the GRO program, I feel as if I began a journey of discovery. Every time I learned of a particular aspect of the fellowship, I was surprised to find that this incredible opportunity just kept getting better. I was initially just honored to be able to work for the EPA no matter where; I did not realize that I would be able to apply for my own project based on my particular interests. When I received the paperwork that explained all the various regions and labs I could apply to, I was overwhelmed with a sense of adventure and could not wait to find where I would end up. I remember hoping that I would find a good fit, but I again underestimated just how fantastic this internship would be.

I approached my college advisor, Dr. Charles Driscoll, armed with ideas and locations, hoping together we could develop the best plan of action. As a Junior, I remember feeling scared and unsure of myself and my dreams. While I had always wanted to work for the EPA, I had not developed a plan much past the application process. Luckily, my advisor's vast knowledge and range of experiences were able to substitute for my own indecisiveness. Dr. Driscoll quietly listened to my fears of indecisiveness and suggested that he had an idea for a project I might like to consider. Having previously worked with the EPA himself, my advisor had connections with the Clean Air Markets Division (CAMD) in Washington, DC. In particular, he was (and still is) a cooperative with CAMD's Assessment and Communications Branch (ACB) and suggested that it would be a compelling place to complete my fellowship. Dr. Driscoll even knew of a long term water chemistry monitoring project orchestrated by the branch that would be a wonderful basis for analysis while I was working there. After listening to his ideas, I again felt shocked and amazed to be presented with such an incredible assignment.

Once I had confirmed with Dr. Driscoll that it was the project I wanted to take on, we began another journey to bring it into fruition. Dr. Driscoll contacted ACB's Branch Chief Rick Haeuber to discuss the realities of my placement and asked ACB Ecologist Dr. Jason Lynch if he would be my project advisor. Having known and worked with Dr. Driscoll before, Dr. Haeuber and Dr. Lynch were seemingly ecstatic to get a chance to work with one of his students and thus we confirmed our partnership. Through a series of conference calls and emails, we began to jointly

develop the scope of my analysis and added a secondary Project Advisor, Biologist Dani Newcomb, who would work with Dr. Lynch to guide me through the summer.

ACB is set up to effectively relay the positive benefits of air quality programs developed by the EPA, so my project was produced to aid in their evaluation of 1990 Clean Air Act Amendments (CAAA). In particular, I was to use the long term monitoring project Dr. Driscoll had initially mentioned to evaluate the success of Title IV, a portion of the CAAA constructed to regulate the volume of sulfate emissions from power plants in hopes of limiting acidic deposition across the Northeastern region. In order to appraise the success of the regulation, it was determined that I would assess the changes in surface water chemistry of the Adirondack lakes in upstate New York, as they were a vulnerable population subject to the deposition. Eventually we defined the project title as, "The long term response of Adirondack surface waters to reductions in acidic deposition," and agreed that I would spend my time at the EPA assessing the lakes' reactions to reductions in deposition. Once the project was developed and confirmed, I started my research under Dr. Driscoll's guidance at Syracuse. I spent the spring semester of my sophomore year getting a feel for the data set and preparing myself for my summer in Washington, DC.

As soon as I started my internship in DC, my project advisors were quick to help me develop a broader range of tools to use in my analysis. All of the research I completed at school was done so using Excel, and while my Excel skills have been vital to the development of my project, Dr. Lynch and Ms. Newcomb's mentoring have truly deepened the overall value of my investigation. Throughout the summer my advisors have helped me strengthen my statistical analysis in teaching me how to best utilize software, such as the R package, and geographical information systems like ArcGIS. As a consequence of my project, I have developed an extensive range of analytical and software skills that will forever help me in my environmental engineering career.

Using these tools, I compiled together an expansive analysis of the data set, so large that I was having trouble conveying the product of my research in written form. I was unsure of what exactly to convey, and how to do so in an efficient manner. I worried that I had over-extended my research; however, Dr. Lynch and Ms. Newcomb were incredibly helpful in helping me to devise a way to communicate my findings. Once I had developed a summary of my initial analysis, we set up a conference call with Dr. Driscoll to assess my progress. Impressed by the array of my preliminary research, Dr. Driscoll suggested that I compile an abstract for submission to the National Atmospheric Deposition Program's Fall 2010 Annual Meeting and Scientific Symposium that is set to take place this upcoming October in Lake Tahoe, CA. Since I had originally had difficulty in communicating my research in written form, I worried that I would be unsuccessful in writing the abstract. Fortunately, my advisors' teachings had stuck with me, and I was able to use their advice to develop a document that was submitted for consideration at the end of July.

Throughout my employment at the Clean Air Markets Division, I have learned a plethora of invaluable lessons on multiple levels. Predominantly, I have analyzed and confirmed positive trends that validate the success of the 1990 Clean Air Act Amendments; however, during the completion of my project I have simultaneously learned so much more. I have very much enjoyed learning how EPA employees fuse together science, technology, and policy to help preserve our Nation's most precious natural resources and hope to emulate their work ethic and prowess throughout my own future career endeavors. To those who may someday get a chance to work for the EPA, I suggest that you make sure to observe the incredible buzz around you and learn from every project within sight. I always hoped I'd get the chance to work for the EPA, but I could have never imagined how truly amazing the opportunity would be. This fellowship has been so much more than a dream job; it has been a source of knowledge, an outlet for self improvement, and a muse to help me further develop my passion to protect the natural world.